# Tbr2 is required to generate a neural circuit mediating the pupillary light reflex.

**Journal:** J Neurosci

**Publication Year:** 2014

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**PubMed link:** 24741035

**Funding Grants:** UCSC Shared Stem Cell Facility, UCSC CIRM Training Program in Systems Biology of Stem cells, UCSC Shared Stem Cell Facility

**Public Summary:**
The retina is the part of the central nervous system that detects light and transduces it into electrical signals that are relayed to the brain via the axons of the retinal ganglion cells (RGCs). There are 20 types of RGCs in mice, each of which has distinct molecular, morphological, and physiological characteristics. Each RGC type sends axon projections to specific brain areas that execute light-dependent behaviors. Here, we show that the T-box transcription factor Tbr2 is required for the development of several RGC types that participate in non-image-forming circuits. These types are molecularly distinct, project to non-image-forming targets, and include intrinsically photosensitive RGCs. Tbr2 mutant mice have reduced retinal projections to non-image-forming nuclei and an attenuated pupillary light reflex. These data demonstrate that Tbr2 acts to execute RGC type choice and/or survival in a set of RGCs that mediates light-induced subconscious behaviors.

**Scientific Abstract:**
There are approximately 20 types of retinal ganglion cells (RGCs) in mice, each of which has distinct molecular, morphological, and physiological characteristics. Each RGC type sends axon projections to specific brain areas that execute light-dependent behaviors. Here, we show that the T-box transcription factor Tbr2 is required for the development of several RGC types that participate in non-image-forming circuits. These types are molecularly distinct, project to non-image-forming targets, and include intrinsically photosensitive RGCs. Tbr2 mutant mice have reduced retinal projections to non-image-forming nuclei and an attenuated pupillary light reflex. These data demonstrate that Tbr2 acts to execute RGC type choice and/or survival in a set of RGCs that mediates light-induced subconscious behaviors.